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INSECTS NOT KNOWN

To Occur In The United States

Issued by

PLANT PEST CONTROL DIVISION

AGRICULTURAL RESEARCH SERVICE

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AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL DIVISION

SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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Plant Pest Control Division
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INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

(129-141 of Series)

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This series was initiated early in 1957 as an aid to strengthening the detection program against foreign insect pests not known to be established in this country. The statements have been released individually in the Cooperative Economic Insect Report but, due to requests for complete sets of the series, the separates published during a year have been assembled under one cover at the close of that year. This is the fifth such compilation. The separates will continue to appear periodically in the Report. Preparation of this material has been made possible through the generous cooperation of Plant Quarantine and Entomology Research Divisions, ARS, the U. S. National Museum and individual cooperators.

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INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

ALFALFA FLOWER MIDGE (Contarinia medicaginis Kieffer)

Economic Importance: This midge is a pest of alfalfa in most alfalfa-growing areas of Europe. Severe damage has been reported on occasions during the past 25 years in Sweden, Denmark, Germany, Czechoslovakia and Yugoslavia. Infestations of 100 percent were recorded in 1937 in Sweden, and more recently, a 50 percent infestation was recorded in Yugoslavia. The severity of infestations depends a great deal upon the weather. During dry years in Czechoslovakia, the emergence date of the adults is delayed and the number of generations consequently reduced. It was reported in the USSR that irrigated fields suffer from much greater populations of the pest. It was also determined in Czechoslovakia that a low infestation in one year may not result in a low infestation the following year. It is suspected that pupae may lay dormant throughout the summer when drought conditions persist. Infested flowers of the alfalfa plant are characteristically shut and swollen. The calyx of infested flowers is always split opposite the standard, the corolla is swollen at the base and the standard envelops the other petals; the stamens are hypertrophied and fleshy, while the ovary remains short and thickened. When the foregoing conditions exist, loss of seed results.

Damage to Alfalfa

General Distribution of Contarinia medicaginis Kieffer

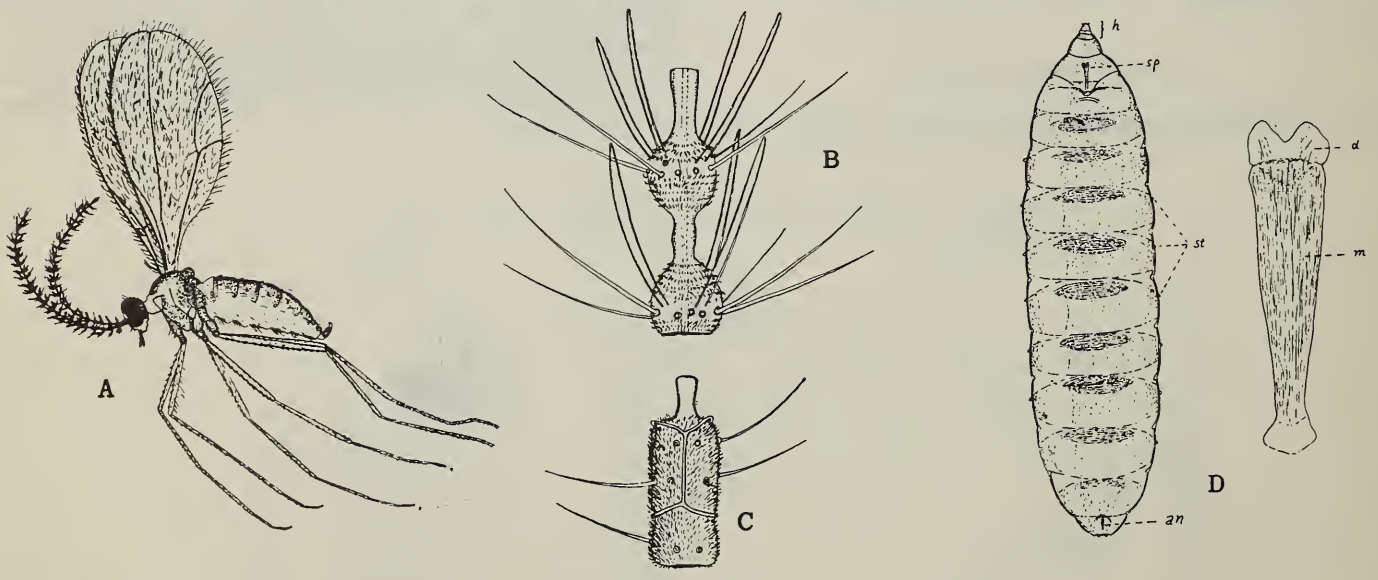
(Cecidomyiidae, Diptera)

Distribution: Widely distributed in Europe, being recorded in Czechoslovakia, Denmark, France, Germany, Great Britain, Holland, Hungary, Italy, Poland, Romania, Sweden, Yugoslavia and in southeastern European USSR.

Hosts: Alfalfa and spotted medic.

Life History and Habits: The biology as recorded by F. Ossiannilsson in Sweden is as follows: Emergence of the adults begins in mid-June and lasts until early August, with peaks in warm weather. Males emerge a day earlier than the females. Adults live only a few days, unpaired females slightly longer, and no food or water is taken. The sex ratio of laboratory emergences was 43 percent males and 57 percent females. Females oviposit chiefly in the evening in the unopened blossom of alfalfa. The average number of larvae per blossom was nearly 5. In the laboratory, the egg period lasted 2 days and the larval about 12. In the soil, larvae spin cocoons at a depth of over 3 cm. at first, but later they leave these cocoons to spin other ones at lesser depths where they pupate. Damp soil is preferred for pupation. Two to three generations are produced annually, with only occasional pupation and emergence taking place in the fall. Some larvae hibernate for two winters. In other areas of Europe, variations in the biology as reported by Ossiannilsson have been recorded. Three generations a year are recorded in England, Germany and Italy; and pupation was recorded in the plant gall in Germany, which may be partially true in the earlier generations. In Poland, oviposition continued for about 2 months, and 2-28 eggs were laid per pod. Larvae hatched in 3-5 days, fed for 11-12 days in the pods and then entered the soil, where they completed development and gave rise to adults 11-18 days later. Pupation is said to take place 3-4 days after entering the soil in Italy.

Description: ADULT - Typical of the genus Contarinia, being dirty yellow in color. LARVA - Glossy yellow and breast bone or spatula distinctly bilobed. Detailed figures of all stages are illustrated below. (Prepared in Survey and Detection Operations in cooperation with other ARS agencies). CEIR 11(9) 3-3-61.



Figures of Contarinia medicaginis: A - Adult male. B - Antennal segment of male. C - Antennal segment of female. D - Mature larva showing sternal spatula.

Major references: 1 Barnes, H. F. 1946. Gall Midges of Economic Importance. Vol. II. 160 pp., London. 2. Blattny, C., Kac, A. and Hoffer, A. 1948. Ochr. Rost. 19-20;40-46. 3. Juchnowicz, I. and Romankow, W. 1958. Bul. Ent. Pologne 28:35-58. 4. Ossiannilsson, F. 1937. Statens Vaxtskyddsanstalt Medd. 3(20): 1-43; illus.

INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

FLEA BEETLES (Chaetocnema spp.)

Economic Importance: Although the genus Chaetocnema is well represented in the United States, several additional species have been recorded as important pests in various parts of Europe, Asia and North Africa. The four species and one subspecies that are more frequently mentioned in the literature are C. concinna (Marsh.), C. tibialis tibialis (Ill.), C. tibialis breviuscula (Fald.), C. aridula (Gyll.) and C. hortensis (Geoffr.). The first three have been recorded as serious pests of sugar beets while the latter two are injurious to cereal crops and various grasses. Of the two that attack cereal crops, C. hortensis appears to be more widespread, but C. aridula is probably the more important since it attacks both oats and barley while the former lives chiefly on barley. Wheat is rarely attacked by either species. All of the species and subspecies that attack sugar beets are considered important in areas where they occur. C. t. tibialis is very injurious in southern France where it is abundant and C. t. breviuscula has been reported as the most important pest of sugar beets in the USSR. C. concinna replaces C. t. tibialis in northern Europe and, in addition to sugar beets, is a serious pest of several other crops which include rhubarb, buckwheat and mangold.

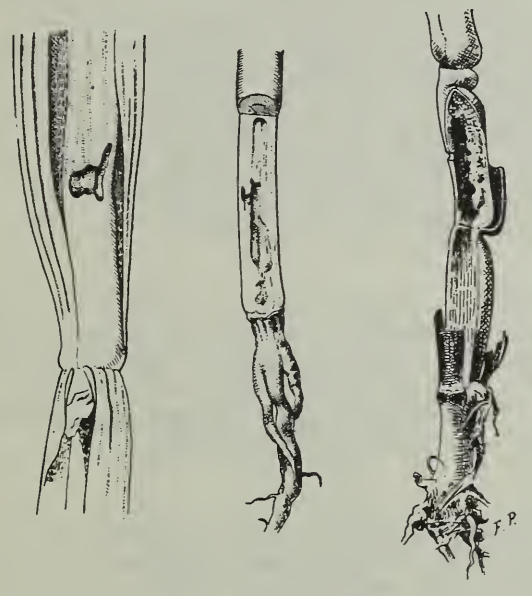


Figure I. Chaetocnema aridula larval damage to stalks of oats

Damage to grain crops is caused primarily by the larvae. Growth of infested plants is slow; the central leaf becomes yellowish and sometimes the terminal buds die. Excessive tillering of infested plants occurs and yields are often-times considerably reduced. Damage is most frequently noted on the margins of fields. Damage to sugar beets is caused primarily by the adults; however, larvae of C. t. breviuscula have been recorded as feeding on beet roots while larvae of C. tibialis and C. concinna develop in roots of Chenopodiaceae and Polygonaceae, respectively. Adult feeding on young sugar beets can be severe, sometimes destroying the crop.

Distribution: C. aridula and C. hortensis occur throughout all of Europe and east to Asia; C. hortensis also occurs in North Africa. C. concinna occurs throughout most of Europe and east into Siberia, but is largely replaced by C. t. tibialis in the southern areas of western Europe. C. tibialis is found in all of Mediterranean Europe, Turkey, Iraq, United Arab Republic (Egypt), southern USSR (including Turkestan) and the Ryukyu Islands (Asia) (the subspecies C. t. tibialis occurs in the west and C. t. breviuscula in the eastern part of the species distribution).

Hosts: C. aridula and C. hortensis have been recorded on a number of grasses and small grains including oats, barley, wheat and rye; however, oats and barley appear to be the most important. Adults of C. concinna, C. t. tibialis and C. t. breviuscula may be found feeding on a number of hosts, but the most economic damage occurs to sugar beets. Adults of C. concinna have also been recorded damaging buckwheat, strawberry, kale, hops, rhubarb, hemp, dullseed cornbind,

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(Chrysomelidae, Coleoptera)

lambsquarter goosefoot, Rumex spp., mangold and a number of other plants; and C. t. tibialis adults have also been recorded on barley, mustard, soybean, rippleseed plantain and all plants of the Chenopodiaceae.

Life History and Habits: The biology of C. aridula and C. hortensis is quite similar. Adults appear during May in France. Eggs are deposited toward the base of young grain or grass plants, sometimes in the axils of leaves or on the tips of leaves. Hatching occurs in a few days and young larvae penetrate into the internode of the stem. It first excavates a fine gallery which is perceptibly horizontal, then ascends irregularly without going beyond the node situated just above. As many as 3 larvae have been found in the same internode. The plant, hindered in development, sometimes appears sinuous and folded. Larvae mature in about 3 weeks and leave the plants through very conspicuous, little round holes at the ground level. Pupation takes place in the soil 6-8 days later and adult emergence occurs in 18-21 days. Adult feeding takes place on wild grasses and hibernation occurs at the base of grass tufts. Mating and oviposition occur the following spring. Only one generation a year has been recorded.

C. t. tibialis appears as early as April in France. They begin feeding on leaves of saltbush, Russianthistle and beets, riddling them with holes which encroach on the parenchyma but do not go through it. Copulation occurs around the first of May and oviposition begins almost immediately. Eggs are laid on the ground. Larvae hatch and feed on roots of host plants. Apparently 2 or more generations occur each year in France. Adults of the last, and even the preceding generations, overwinter.

Overwintered adults of C. concinna appear as early as the last of April and immediately attack leaves of Polygonum. Copulation and oviposition occur during the warm hours of the first fine days. Isolated eggs are deposited in the ground at the base of host plants. Incubation takes 15-30 days, after which young larvae hatch and excavate fine superficial galleries in the roots of Polygonum. Larvae mature in about 28 days and leave plants to pupate in the soil. New adults emerge in about 30 days and seek hibernation quarters.

The life cycle of C. t. breviuscula is similar to that of C. concinna and C. t. tibialis with the exception that larvae feed on the roots of sugar beets.

Descriptions: The species of Chaetocnema that attack grain crops, C. aridula and C. hortensis, are similar in appearance as are the species and subspecies that attack sugar beets, C. concinna, C. t. tibialis and C. t. breviuscula. Detailed illustrations of C. aridula and C. concinna can be found on pages 881 and 882. Adult descriptions follow.

C. aridula and C. hortensis ADULTS - Length 2.5 mm.; moderately shining metallic greenish to bronze piceous; head wide; frons without longitudinal oval relief between points of insertion of antennae that is found in C. concinna. Punctation of head rather fine, more marked at inner margin of eyes. Supraantennal plates inconspicuous (see fig. II). Antennae 11-segmented; first 5 more or less tinted with yellowish. Pronotum uniformly punctate; narrow flange on base and sides. Metasternum regularly punctate both on its disc and on its sides (see fig. II). Scutellum smooth; elytra dark, dullish bronze with irregular punctures, sometimes more or less lined up in form of striae. Legs yellowish or brownish, with exception of femora which are greenish black. Four hind tibiae show externally, at the level of their terminal third, a large tooth underlined by a fringe of hairs, which represents the extremity of the very strongly lengthened tarsal basket. Tarsi 4-segmented; third widened and grooved (notched). First segment of four front tarsi in males very conspicuously dilated and as long as other 3; posterior femora strongly swollen.

Adults of C. aridula and C. hortensis can be separated by the following:

1. Top of head and surface of pronotum more finely punctate than the frons and the face. Elytra punctate at random, except sometimes behind and on the sides. Segments of the base of the antennae spotted with brown above, at least the first. Front femora of a metallic greenish black. General form rather elongated.--------C. aridula.

2. Top of head and surface of pronotum strongly and densely punctate with punctures as strong as those of the frons and of the face. Elytra showing twin punctures in pairs and forming rather conspicuous striae behind and on the sides. Segments of the base of the antennae of a uniform yellow, without a spot. Front femora of a brownish black.----------C. hortensis.

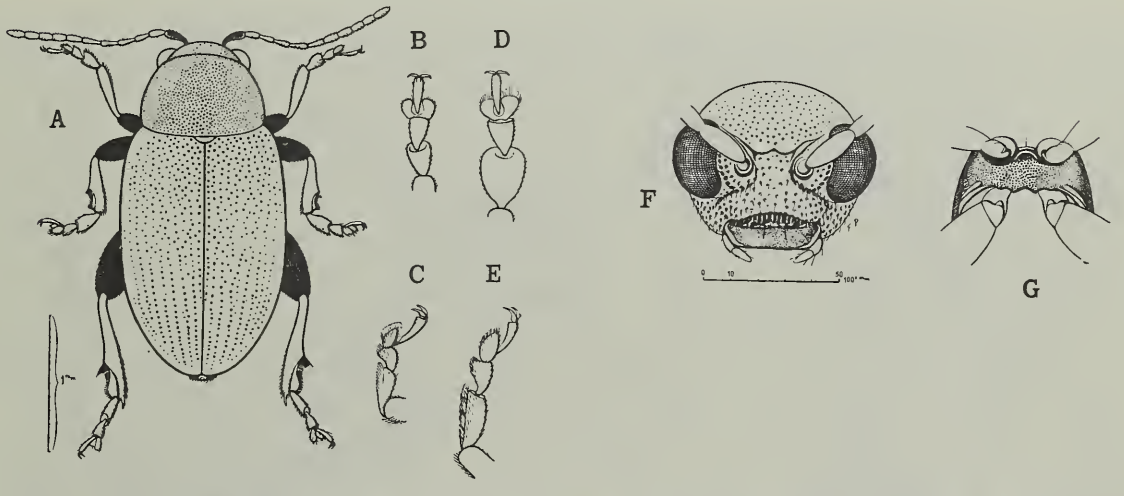


Figure II. Illustrations of Chaetocnema aridula (Gyll.) : A - Adult seen from above. B - Front tarsus of female; C - same in profile. D - Front tarsus of male; E - same in profile. F - Head seen from above. G - Underpart of metasternum showing punctation.

C. t. tibialis and C. concinna ADULTS - Small, 1.5 mm. long, relatively wide and rather strongly arcuate above. General color rather dull metallic green with more or less coppery reflection on head and prothorax. Antennae black, except for first 5 segments which are testaceous. Legs colored as follows: All femora black; tibiae and tarsi testaceous. C. t. tibialis head shows, between the antennae, a longitudinal oval elevation laterally edged by a row of punctures (or dots) which is prolonged and curved in along the cheeks. (see fig. III). Pronotum rather arcuate, densely and distinctly punctate; behind its anterior angles is found a well-marked callus; its sides distinctly flanged, but its posterior margin is not. This is the essential character permitting separation of C. t. tibialis from C. concinna. C. concinna shows a pronotum that is finely flanged behind all along its base; elytra with well-marked punctate striae; interstriae dull, finely punctate and reticulate. Males of both C. t. tibialis and C. concinna show greatly dilated first tarsal segments which are 2 times wider than the following ones.

C. t. breviuscula ADULT - It differs from C. concinna in that there are no oblique depressions on the pronotum and no punctures near the base of the elytra. It differs from C. t. tibialis by the considerably smaller number of punctures on the frons between the eyes. Interspaces between punctate striae on elytra of C. t. breviuscula have small punctures, without transverse rugae; base of antennae, tibae and tarsi testaceous, lightly reddish; length 1.5-2.2 mm. (Prepared in Survey and Detection Operations in cooperation with other ARS agencies). CEIR 11(37) 9-15-61.

Figure III - Chaetocnema t. tibialis (Ill.) head, front view.

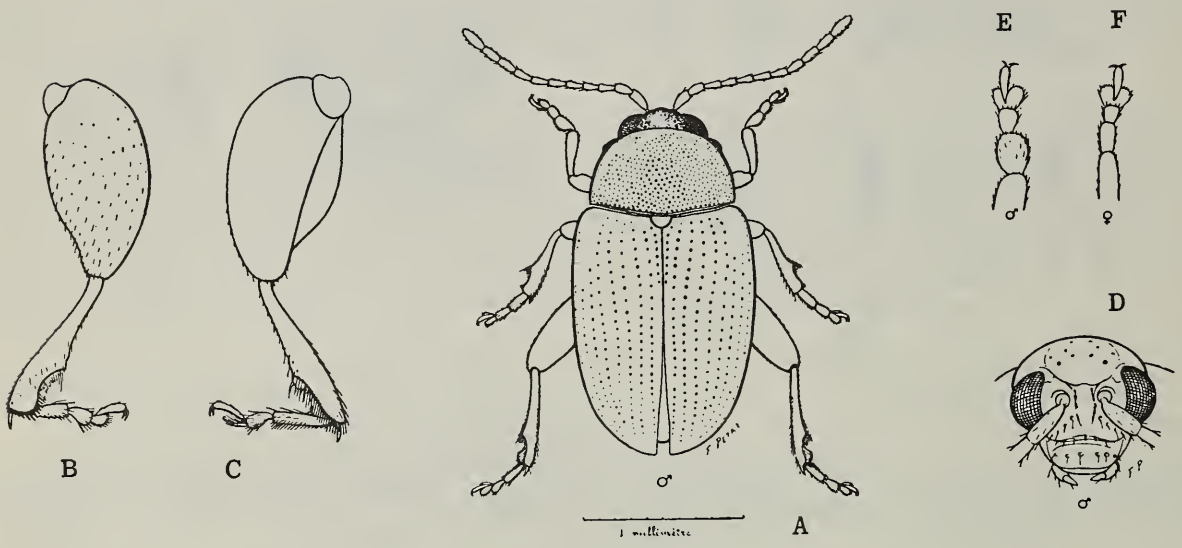


Figure IV - Illustrations of Chaetocnema concinna (Marsh.) A - Adult, dorsal view. B - Hind leg, dorsal view; C - same, ventral view. D - Head, front view. E - Front tarsus of male; F - same of female.

Major references: 1. Balachowsky, A. and Mesnil, L. 1935, 1936. Les Insectes Nuisibles aux Plantes Cultivees. Vol. 1 and 2, 1921 pp., Paris. (Figures of adults and damage). 2. Shchegolev, V. N. 1955. Agricultural Entomology. 616 pp., Moscow. /In Rus., p. 375/. 3. Heikertinger, F. and Csiki, E. 1940. Coleopterorum Catalogus /W. Junk/. Pt. 169. Chrysomelidae, Halticini. pp. 385, 387, Gravenhage, Netherlands.

INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

GOUT FLY (Chlorops pumilionis (Bjerkander))

Economic Importance: This chloropid fly is one of the most serious pests of winter and spring wheat, barley and rye in Europe. When climatic conditions are favorable, destructive outbreaks may occur. Activity of the pest is greatly reduced by cold, windy or rainy weather. The symptoms of infestation differ according to the time of year. The second-generation or winter-brood larva stunts the attacked shoot and causes an increase in the breadth of the leaves which appear unusually green. There appears to be no stem, while the central leaves are spirally curled. The first-generation or summer-brood larva causes a characteristic swelling of the stem of two or three internodes ending in the swollen head imprisoned in its sheathing leaves. It is from this latter symptom that the name gout fly is derived. Infested plants cease growth almost immediately. The reduction in grain yield has been over 50 percent in many instances and sometimes total loss of the crop has resulted from infestations of the pest.

A B

Damage to Cereal Crop Plants by Larvae of Chlorops pumilionis (Bjerkander)
A - Typical Injury by Second Generation (Winter Brood)
B - Typical Injury by First Generation (Summer Brood)

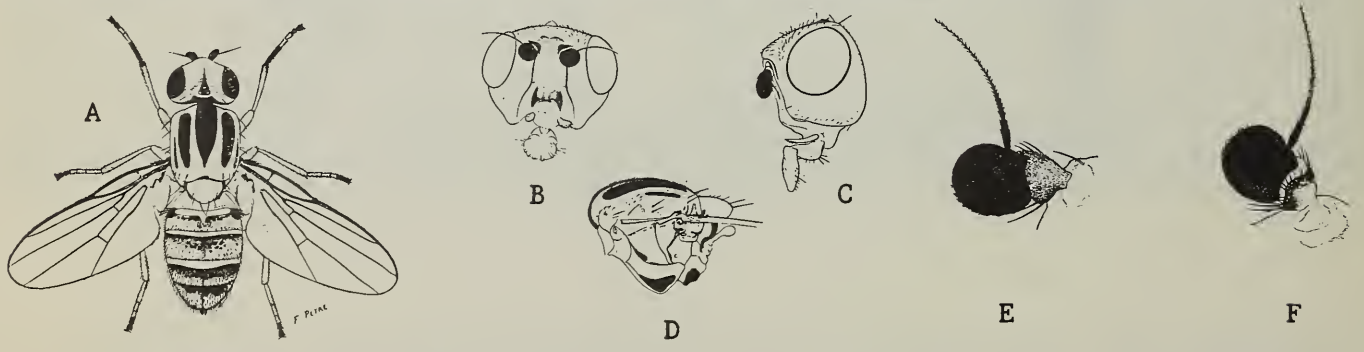
(Chloropidae, Diptera)

Hosts: Wheat, barley and rye are the principal cultivated hosts and quackgrass (Agropyron repens) the most important and probably the only wild host plant.

Distribution: Recorded throughout all of Europe and into Siberia in the USSR. The pest is also believed to be present in the Far East.

Life History and Habits: Two generations are reported throughout most of the area of the insect's distribution; a summer and a winter brood. In the British Isles, adults emerge about the end of May and deposit eggs singly, usually on the upper side of the leaves of host plants. Normally only one egg is laid on each shoot. Eggs hatch in about 8 days. The young larva enters the center of the shoot and then feeds its way down one side of the developing head and on as far as the first internode, leaving a characteristic groove. The larva passes through 2 molts, after which it turns around with its head pointed upward and ascends a short distance before pupation. Second-brood adults emerge about 36 days later in August. Oviposition by this brood usually takes place on quackgrass, but occasionally on winter wheat or barley and on volunteer wheat and barley. Larvae overwinter head downwards in shoots of host plants and pupate after reversing their position about late February or early March.

Description: ADULTS - Male: Head yellow, occiput dark, a black triangular patch about the ocelli; frons brownish-yellow; antennae black, yellow at base; lower part of face paler, eyes green and rather large. Thorax yellow, with 3 broad, dark brown stripes; scutellum much paler, whitish, arched on its upper side. Abdomen brown dorsally, with dark bands on the segments. Wings grayish with brown veins and extend beyond the abdomen when folded. Legs pale; tips of tarsi and tips of front tibiae black; front tarsi black at base. Female: Larger than male and of a greenish tint. Length 5 mm. EGG - Whitish, elongate-oval, surface hexagonally sculptured, flattened ventrally without sculpturing, but with a ventral groove. Length 1 mm. LARVA - Mature larva cylindrical, tapering rapidly towards anterior end and more gradually towards the posterior. Head small, with a smooth surface, lacking the usual chitinous ridges. Two prominent maxillary palps present, each consisting of a small rounded group of sense papillae surrounded by a dark brown chitinous ring. Antennae laterally, instead of anteriorly, placed. First 2 thoracic segments covered with rows of chitinous spines around the anterior border, while the third thoracic segment has an anterior band of spines only. Eight of the 9 abdominal segments bear a band of chitinous spines around the anterior border, while the ninth segment bears the anus and the posterior spiracles situated at the apices of 2 papillae. Length 6.3 mm. PUPARIUM - Yellowish-brown, somewhat flattened. (Prepared in Survey and Detection Operations in cooperation with other ARS agencies). CEIR 11(48):12-1-61.



Illustrations of Chlorops pumilionis (Bjerkander) Adult: A - Dorsal view of insect. B - Head, frontal view. C - Head, lateral view. D - Thorax, lateral view. E & F - Antenna, two views.

Major references: 1. Smith, K. M. 1948. A Textbook of Agricultural Entomology. 289 pp., Cambridge. 2. Balachowsky, A. and Mesnil, L. 1935. Les Insectes Nuisibles aux Plantes Cultivees. Vol. 1, 1137 pp., Paris. (Illus.).

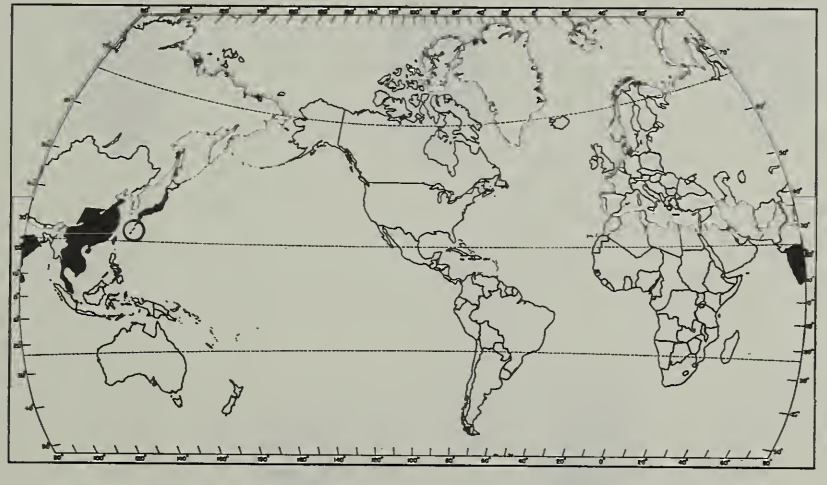
INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

RICE PENTATOMID BUG (Scotinophara lurida (Burm.))

Economic Importance: S. lurida is a major pest of rice in areas of Japan, China and Ceylon. Damage to rice in Ceylon first became serious in 1940, and since that time periodic outbreaks have occurred in the Southern Province where two crops are grown annually. The bug's feeding causes localized, chlorotic leaf lesions on rice grown in the field. The lesions gradually dry up and frequently result in death of that portion of the leaf between the lesion and the leaf tip, death of the central shoot or death of the entire plant. In the laboratory, it has been shown that feeding near the growing point of seedlings always leads to death of plants without subsequent tillering; however, when feeding takes place more than 1.5 inches above the growing point, the leaves develop necrotic patches and dry off but the plant tillers and the rest of it grows normally. In Japan, early planted varieties of rice are most heavily infested and densely planted fields are preferred. One adult per rice plant in the spring may be responsible for total loss of the crop. Control has been obtained in China by flooding the plants to depths of 4 to 5 inches every fourth day for a full day; however, submergence for over 16 hours will affect the parasite emergence.

Hosts: Recorded on rice and related grasses, wheat, Panicum spp. and wildrice. Also found to feed on corn, foxtail millet, Panicum miliaceum, napiergrass and guineagrass in the laboratory. Eggs of S. lurida have been observed on many plants, and it is quite likely that adults or nymphs of this species will feed on many plants other than those mentioned above.

Distribution: Ceylon, China (southern part), Formosa, Indochina, Japan (Honshu, Shikoku, Kyushu), Loochoo Islands, Malaya, Okinawa and Thailand.



Distribution of Scotinophara lurida (Burm.))

Life History and Habits: The biology as recorded in Southern Ceylon is as follows: Adults or late nymphal stages aestivate (between rice crops) in cracks in the bunds in rice fields or on neighboring higher ground. Adults leave aestivation sites in April and May or November and December, depending on the planting, and settle on the crop when it is 2 or 3 weeks old. Activity takes place largely at dusk or at night. After adults feed for about 7 days, copulation takes place and oviposition

(Pentatomidae, Hemiptera)

commences about 10 days later. Egg masses, in the field, consist of 2 rows, each containing 7 eggs, but under artificial conditions the number of eggs and rows increased substantially. At a relative humidity of 75 percent and temperature of 25-28 degrees C. in the laboratory, the average duration of the stages was as follows: Egg, 6 days; the five instars, first - 5 days, second - 9 days, third - 7 days, fourth-9 days and fifth - 12 days, respectively. There are 4 overlapping generations a year in Ceylon. The biology of S. lurida is generally similar in both Japan and Ceylon, but some differences do occur. In Japan, only one generation a year occurs and hibernation takes place in the winter. Adults usually enter hibernation in Japan in September and early October and emerge in June and July. Feeding habits also differ in the two countries. In Japan, S. lurida feeds both as an adult and in nymphal stages on all parts of the rice plants, whether seedling, maturing or mature; whereas in Ceylon, this insect feeds as an adult on all parts of the seedling and only on the basal region of maturing or mature rice plants, while nymphal feeding is limited to the basal parts of the rice plants whether seedlings or otherwise.

Description: ADULT - Color dull dark brown; length 9-10.5 mm.; width 5-5.5 mm. Broadly ovate in shape. Head slightly convex and sinuate in front of eyes. Antennae about half as long as body, with broad basal joint concealed when viewed from above; second joint distinctly shorter than third; terminal joint slightly thicker than others. Rostrum 4-jointed and reaching posterior coxae. Ocelli lateral in position. Thorax almost black and coarsely punctate; pronotum with straight lateral margins, with distinct spine near each anterior angle; scutellum narrowed behind the base and almost reaching apex of the abdomen. Coxae and femura black, with remaining segments of legs brown; tarsi 3-jointed. Undersurface black, becoming brown toward margin. EGG - About one mm. long, cylindrical and pale green when first laid, later turning pinkish. NYMPH - Instars variable somewhat in color, usually shades of brown, although pinkish shades are found on abdomen in the third instar. Mid-dorsal, transverse bands present on abdomen in all instars. Abdomen also finely punctured with black. (Prepared in Survey and Detection Operations, in cooperation with other ARS agencies). CEIR 11(20):5-19-61.

USDA Photograph

Adults and Nymphs of Scotinophara lurida (Burm.)

Major references: 1. Alwis, E., de. 1941. Trop. Agriculturist 96(4):217-220. 2. Fernando, H. E., 1960. Bul. Ent. Res. 51(3):559-576. 3. Katsumata, K., 1930. Results of the studies on Scotinophara (Podops) lurida, Burm. 240 pp.; Ishikawa, Ishikawa-Ken Agr. Expt. Sta. In Jap.

INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

WHEAT STEM WEEVIL (Hyperodes bonariensis Kuschel)

Economic Importance: This curculionid, native of Argentina, is a very serious pest of ryegrasses in New Zealand. It was first recorded in that country in 1927. In addition to being a pest of ryegrass, it is also a pest of barley and wheat. Infestations varied from 3-4 percent in wheat in New Zealand during the summers of 1936-37 and 1937-38. During the three-year period, ending May 1958, stands of ryegrass were generally infested in the Canterbury area of New Zealand, and in all districts there were instances of complete destruction of first- and second-year stands, sometimes more or less uniformly, but usually in patches of variable size. Larval damage is most severe; only one larva can cause complete death of a young tiller. When seed heads are produced, larval feeding results in a "white head" that does not seed. Roots are not damaged as in white grub feeding, however. Adult feeding results in a silvery appearance to the leaves, mainly on the tips, but sometimes causes spots or stripes on the leaves. When the adult population is heavy (over 20 per square foot), nearly complete loss of stand is possible, due to larval feeding of the next generation. Plant recovery from adult feeding is usually good, however, unless complicated by larval damage.

Distribution: Argentina and New Zealand.

Hosts: In New Zealand, larvae feed on Italian and perennial ryegrasses, orchardgrass, sweet vernalgrass, Chewings fescue, wheat, oats and barley, and sometimes rape. Adults feed on all grasses (except Yorkshire fog), clovers, alfalfa, cereals and crucifers.

Life History and Habits: The biology as reported in New Zealand is as follows: Adults can be found throughout the year; no true overwintering was observed. However, two generations a year are clearly indicated. Eggs can be found throughout September, October and early November; larvae from late September to mid-December; pupae from late November till mid-January; and adults from early December till last of February. Eggs of second generation are present from mid-December till end of March; larvae from mid-January to early May; pupae from early March to mid-May. Eggs took 12-24 days to hatch in the laboratory, but no larvae were observed earlier than 23 days in the field. The pupal period varied 7-15 days. Adults are active during both day and night, feeding mainly at night. Adults are difficult to detect in or on the soil because of coloration and methods of camouflage, including feigning death. In heavy infestations, over 20 per square foot are present in or on the soil, but more than likely, only 1 or 2 will be readily found. Adults usually feed on only one side of a grass leaf, hence the silvery appearance. Eggs are laid in a pocket of leaf sheath tissue (always from the back of leaf sheaths), closely adhered to tillers. These pockets never extend through to the next leaf or stem and no eggs are laid between the sheath and stem. Two eggs (sometimes 1 or 3) are laid in each pocket, which is no more than 2 inches from the ground. Newly hatched larvae tunnel in leaf sheaths, always downwards. Afterwards, however, no consistent larval behavior pattern was observed. In the presence of seed heads, larvae entered near any of the nodes from second to seventh, and though initially they moved upwards, they usually moved down again when full-fed. Tunnelling of any size caused "white heads." When mature, larvae cut holes in sides of tillers or straws and dropped to the ground to pupate.

(Curculionidae, Coleoptera)

Description: ADULT - Brown-black; antennae and tarsi ferrugino-testaceous; entirely covered dorsally with very crowded squamae, yellowish and ashy gray; the latter forming 3 bands on the prothorax, the median narrow, the lateral ones wider and prolonged onto the humeri, some small spots on the elytra, more numerous on the sides; only the odd interstriae, at least before, provided with rather long setae. Snout short, its carinae fine, hidden by the clothing. Frontal pit small. Antennae short, first segment of the funicle of the duplicate only as long as wide, much thicker than the second. Prothorax oblong, narrower and rather strongly constricted before, the sides moderately arcuate, densely puncto-granulate, the clothing dense, the setae short; subtruncate on the anterior margin, its ocular lobes nearly absent. Scutellum densely squamulate. Elytra with striae hidden by the clothing, the interstriae slightly convex. Legs densely squamulate and pubescent; front tibiae bisinuous and granulo-grated inside. Underneath with dense punctation, squamulate, and pubescent before; pubescent only, behind. Male with one rather deep pit on the anal segment. Length, 3.5-3.8 mm. (Prepared in Survey and Detection Operations in cooperation with other ARS agencies). CEIR 11(3):1-20-61.

USDA Photograph

Adults of Hyperodes bonariensis Kuschel
(Enlarged)

Major references: Kuschel, G. 1955. Rev. Chileana de Ent. 4:261-312. Kelsey, J. M. 1958. N. Zealand Jour. Agr. Res. 1(5):790-795. Hustache, A. 1926. Mus. Nac. de Historia Natural An. 34:205. (Entomologia Pub. No. 140), Argentina.

INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

HOP FLEA BEETLE* (Psylliodes attenuata Koch)

Economic Importance: This chrysomelid is considered to be one of the most important pests of hop and hemp in Europe. Local, sporadic outbreaks on hops have been very severe in England and in areas of middle Europe, particularly when weather conditions are favorable. The adults feed on the tender leaves of hop plants, which become badly skeletonized if the adults are numerous, and growth may be severely retarded. The hop cones are also attacked; particularly on young plants and those in nursery beds. Cone damage has been regarded as the most economic, since feeding by the adults riddles them with small holes, which decreases their market value. In the USSR, damage by the adults to hemp has been placed second only to the damage caused by the European corn borer (Ostrinia nubilalis). The adults of P. attenuata skeletonize the leaves of hemp and retard development of the plants. The stems, from which fiber is obtained, are shorter by 7 to 37 percent and the loss in yield of seeds varies from 13 to 47 percent. Some larval damage also occurs. In England, several other species of flea beetles have been reputed to attack hop, but P. attenuata is the only one that caused economic damage. This beetle has often been mistaken for Chaetocnema concinna in England.

Distribution: Apparently occurs throughout most of Europe, except in the extreme northern and some southern portions, and east into Siberia in the USSR.

Hosts: Hop, hemp and bigsting nettle (Urtica dioica).

General Distribution of Psylliodes attenuata Koch

Life History and Habits: The biology as recorded in England is as follows: Adults overwinter in various places, including old hop bins, in crevices of hop poles and under debris and soil. The adults may be found on nettles adjacent to hop gardens until the winter is far advanced. Only one generation a year occurs, the total

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* Also known as hemp flea beetle (Chrysomelidae, Coleoptera)

life cycle from egg to adult being 67-71 days. Adults first appear in May and begin feeding on nettle and hop plants. Eggs are deposited in the soil near hop hills during May and June and the resulting larvae feed on roots of various plants including hop. Adults reappear in September and start to feed in the cones. In the USSR, the biology as recorded in the northern districts of the Black Soil Zone is as follows: Adults begin to emerge at the beginning of May, being particularly abundant in July and disappearing about the middle of August. Each female may lay about 300 eggs, which are deposited in the upper layer of soil. Larvae hatch in 8-10 days and feed on small roots of hemp, pupating in the soil. The total life cycle from egg to adult is completed in 52-70 days. New adults attack leaves of hemp and hop plants, passing to these crops from bigsting nettle (Urtica dioica).

Description: ADULT - Oval, coppery or greenish. Head small, with punctures; two crossed furrows present between eyes; antennae dark, lighter at base. Thorax thickly punctured. Elytra long, with regular and deep punctures. Legs reddish-brown, femora darker. Differs from Chaetocnema concinna and C. tibialis in the 10-segmented antennae and hind tibiae. (See illustration below). Length 2-3 mm. EGG - Pale yellow, oval. Length 0.5 mm. LARVA - White; head capsule, prothoracic and anal plates light brown. Length 5-6 mm. PUPA - White. On first four abdominal segments are four setae in a cross-line and six on the remaining segments. Length 3 mm. (Prepared in Survey and Detection Operations in cooperation with other ARS agencies) CEIR 11 (49):12-8-61.

Left - Adult of Chaetocnema tibialis breviuscula (Fald.).

Right - Adult of Psylliodes attenuata Koch.

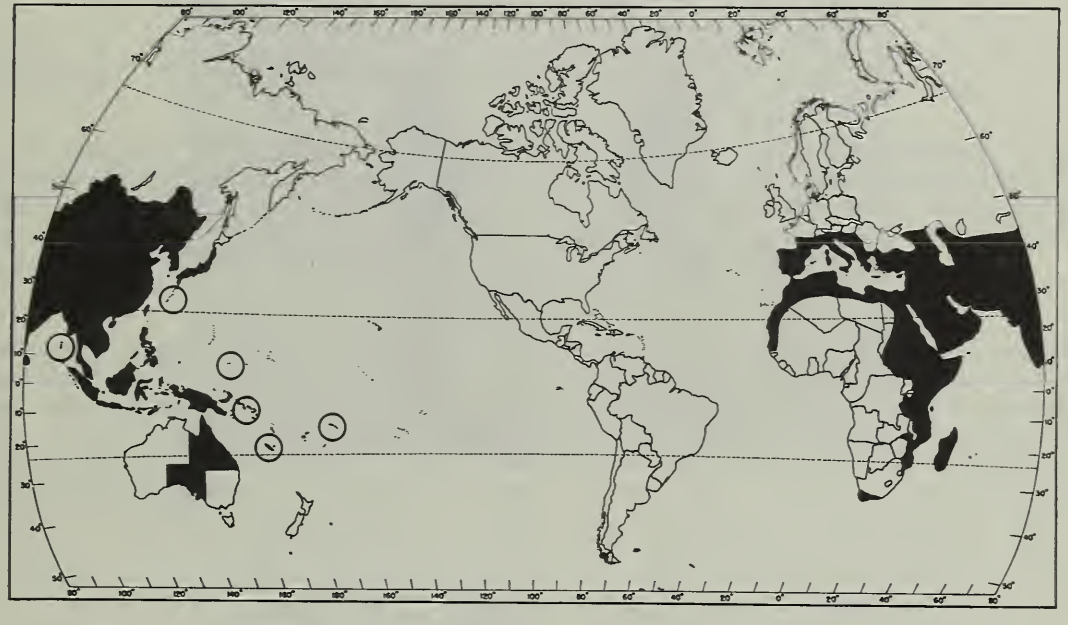
Major references: 1. Andreeva, N. V. 1930. The Hemp Flea Beetle and its Economic Importance. Sev.-Chernoz. Oblastn. Sel.-Khoz. Opuitn. Stantz. Bul. 1:20-23. (In Rus.). 2. Massee, A. M. 1954. The Pests of Fruits and Hops. 326 pp., London. 3. Smith, K. M. 1948. A Textbook of Agricultural Entomology. 289 pp., Cambridge. Figures (except map) from Shchegolev, V. N. (Ed.). 1949. Sel'skokhozyaistvennaya Entomologia. 764 pp., Moscow. (In Rus.).

INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

RED PUMPKIN BEETLE (Raphidopalpa foveicollis (Lucas))

Economic Importance: The genus Raphidopalpa is not known to occur in the United States. One or more species in this genus cause economic damage to cucurbits in areas of Australia, Asia, Europe and Africa. R. foveicollis, for example, is rated as one of the most important pests of melons in Greece where the larvae cause serious damage to roots in irrigated plantings. It is also regarded as a serious threat to melon production in North Africa, Italy, Iran, and other areas. In addition to the larvae feeding in roots and stems, the adults feed on foliage and flowers. Seedling plantings are sometimes destroyed. Other important species of Raphidopalpa include adominalis (F.), chinensis Ws., femoralis (Motsch.), and orientalis (Honst).

Distribution: Raphidopalpa spp. have been reported from many areas of Australia, Asia, Europe, Africa and from islands near these areas. The distribution of the individual species, as well as their taxonomy, apparently needs additional study.



General Distribution of Raphidopalpa spp.

Hosts: Cucurbits preferred, although the species mentioned here have been collectively recorded from many other plants.

Life History and Habits: The following refers to R. foveicollis: Adults overwinter under debris and fallen leaves and emerge from early spring (April-May) onwards in the Mediterranean region, becoming most numerous in Greece during June. These congregate on leaves of cucurbits which they will riddle with holes or, in the case of tender leaves, perhaps skeletonize. Whole plantings of seedlings may be destroyed. On old plants flowers are also eaten. In Italian observations oviposition began towards the end of May, the females subsequently depositing more than 300 eggs each. Eggs were usually laid singly or in pairs in soil at the base

of the plants, mainly in shady places or under clods. They hatched in 14-16 days in May-June and in 8-10 days in July. Larval and pupal stages in the soil lasted 30-40 and 8-10 days, respectively. The larvae characteristically feed on roots and stems, occasionally boring into them. Leaves and fruit in contact with the soil are also attacked. In the Israel area, 2-4 generations a year are said to occur, but elsewhere in the Mediterranean region only one generation is reported.

Description: Raphidopalpa foveicollis adult is 6.5 to 7 mm. long, entirely rose vermilion, except areas on ventral surface of the thorax and abdomen which are black, and covered by a fine gray pubescence. The eyes and points of mandibles are also black. The antennae, 11-segmented, are inserted between the eyes. First segment is long and swollen, the second very short. Tarsi are four-segmented, the first elongated. The shape of the pronotum is a remarkable characteristic which aids in recognition. This is excavated above, with a deep impression running from one side to the other. (Prepared in Survey and Detection Operations in cooperation with other ARS agencies). CEIR 11(4):1-27-61.

USDA Photograph

Adults of Raphidopalpa foveicollis (Lucas)

Major reference: Balachowsky, A. and Mesnil, L. 1936. Les Insectes Nuisibles aux Plantes Cultivees, pt. 2:1329, Paris.

INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

PERUVIAN COTTON STAINER (Dysdercus peruvianus Guerin)

Economic Importance: This pyrrhocorid is considered to be the most serious pest of cotton in Peru. During the 1957-58 season, the total losses attributed to this pest were estimated at about 10 million dollars. During the bug's migratory period, as much as 30 percent of the bolls in the most advanced fields may be lost and up to 70 percent of the fiber may fail to develop, the latter being attributed to fungus organisms of the genera Alternaria and Acremonium which are mechanically introduced into the interior of the bolls through the feeding punctures. Populations as low as 10 adult bugs per 100 cotton hills can cause economic damage if allowed to persist in a given area. During the migration period, counts of less than 50 per 100 hills should be maintained if severe crop losses are to be avoided. In addition to the losses in yield, the crop may sustain further losses in grade of fiber and quality of seed. The quality of the seed is reduced by insect feeding and the gregarious nymphs are often crushed in the picking operation, staining the fiber with their bright red bodies.

Distribution: Peru, Colombia, Venezuela, Brazil.

Hosts: Recorded on a number of plants in the families Malvaceae, Bombacaceae, Cochlospermaceae, Solanaceae, Compositae, Euphorbiaceae, Amaryllidaceae and Rosaceae. However, wild and cultivated varieties of cotton (Gossypium spp.) are the most important, and apparently preferred, hosts. Incidental feeding has also been recorded on eggplant, mango, guava and orange.

Life History and Habits: The biology as recorded in Peru is as follows: Breeding takes place in the Andean foothills during the early spring when mist-like rains promote the growth of vegetation. Feeding takes place on newly formed fruits of wild Malvaceae and other hosts. Sometime during the summer, depending upon weather conditions, movement down the slopes to the coastal valleys takes place. Cotton bolls and seed provide nutrients essential for maximum reproduction. Mating is frequently observed in cotton at this time. Groups of about 50 eggs are usually laid superficially in the soil under the leaf litter and near the base of the plant. Hatching takes place in 5-7 days and the first two instars tend to congregate in the nest area, making occasional forages up the stalk to feed on the juices of green leaves. Nymphs in the last three instars disperse over a number of plants in the immediate area and begin feeding on succulent small bolls and mature seed in open bolls. Late in the season, several hundred nymphs may be found on a single plant and large numbers may be found swarming over the irrigation ditches. The final molt takes place about 30-40 days after hatching. Adult migration then takes place from field to field in the valley. Adults feed on the moist content and developing seed in the bolls. Injury depends largely on the number of punctures, stage of maturity of the plant and the age of the boll at the time of injury.

(Pyrrhocoridae, Hemiptera)

Description: EGG - Almost round; creamy white at first, changing to bright orange before hatching. NYMPHS - Bright red, with black and white markings. ADULTS - Female 4 mm. wide and 14 mm. long; male somewhat smaller. Color varies from bright red to reddish-yellow. Pronotum with apical third black and with anterior border narrowly margined with white. Scutellum and legs either light or dark. (Prepared in Survey and Detection Operations in cooperation with other ARS agencies and Richard W. Bagley, Development Entomologist, Agricultural Chemicals Division, Union Carbide Chemicals Company). CEIR 11 (7):2-17-61.

Adult and Nymph of Dysdercus peruvianus Guerin

Major reference: Wille, J. E., 1952. Entomologia Agricola del Peru. Min. Agr. (La Imprenta Americana). pp. 20-34. Photographs courtesy of R. W. Bagley.

INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

LARGE PINE WEEVIL (Hylobius abietis (L.))

Economic Importance: This weevil is generally considered to be one of the most important forest pests in Europe. It has increased in importance as a pest of young conifers in many parts of Europe since World War II as a result of large-scale felling and replanting of pine and spruce. The pest breeds in stumps and the adults damage living trees by gnawing the bark. Feeding on the succulent portions beneath the young bark and in the cambial layer by the adults can cause serious damage. Irregular holes are cut into the young stems, the lower part being damaged the most. In severe cases the whole stem becomes pock-marked. The attack persists from early spring until late summer in Britain, with a peak in numbers being reached in midsummer when new adults of the latest brood emerge. Feeding generally subsides when the weather is cold or wet. Injured trees are preferred, but when adults are abundant they readily attack uninjured trees. Epidemic numbers of this weevil occur commonly in forest areas of Britain and in Europe.

Pock-marking Damage to Pine

Hosts: The weevil will attack all conifers and many hardwoods including oak, birch and sycamore. Scotch pine and Douglas-fir are two of the favorite host plants in Britain.

General Distribution of Hylobius abietis (L.)

(Curculionidae, Coleoptera)

Distribution: Occurs throughout most of Europe and through Siberia in the USSR to Korea and Japan.

Life History and Habits: The biology as recorded in Britain is as follows: Adults overwinter in the soil just below the surface or, when the weather is colder, at deeper levels. Activity in the spring is dependent on the temperature; it begins January and February in the South and in April in the northern districts. Peak activity is reached from mid-May to mid-July in the South, followed by a tapering off period until activity ceases altogether in September. The adults are long-lived. Those that emerge first in the spring are mostly one or more seasons old. Those that appear later are adults preparing to breed for the first time or those that are just leaving their pupal cells after overwintering as larvae. Newly emerged adults feed on bark of fallen stems or branches until their reproductive organs reach maturity. Eggs are deposited on stumps and roots of coniferous trees either below or just above the soil level. Hatching takes place in 2-3 weeks and young larvae burrow longitudinal tunnels in the roots or branches. The larvae remain in the tunnel until the following summer when pupation takes place. Adult emergence takes place 3 weeks after pupation. Feeding by the new adults proceeds actively in warm weather and mating takes place if weather conditions permit. If not, the adults hibernate in the stumps or soil.

Description: ADULT - Length 8-14 mm. General color: Piceous, with patches of yellow hairs. Snout broad and coarsely punctured. Antennae inserted at apex of snout. Prothorax nearly as broad as long, sides rounded, narrowed in front, coarsely punctured. Patches of yellow hairs on sides and behind, near scutellum. Elytra parallel-sided, tapering markedly just near apex. Striae with well-marked chains of punctures, especially in center. Interstices broad and roughly punctured. Yellowish hairs present in small, isolated patches and also in 2 irregular transverse bands. Larger patches also present near apex. Legs black or piceous, femora armed with a strong tooth. (Prepared in Survey and Detection Operations in cooperation with other ARS agencies). CEIR 11 (30) 7-28-61.

Adult of Hylobius abietis (L.)

Major references: 1. Boas, J. E. V. 1924. Dansk forstzoologi, 763 pp., Copenhagen. Illus. 2. Chrystal, R. N. 1937. Insects of the British Woodlands, 338 pp., London. 3. Forestry Commission. 1920. Pine Weevils. Gt. Brit. For. Comm., Leaf. 1, 12 pp.

INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

A POPLAR CLEAR WING (Paranthrene tabaniformis Rott.)

Economic Importance: This aegeriid is one of the more important pests of poplar and several other hardwood trees in areas of Europe. Damage to nursery trees and young forests can be severe. Galleries made by the larvae in young trees can weaken the limbs and cause them to be easily broken off by wind; galleries in older trees can make the wood unsuitable for use or depreciate its value considerably. Thickened areas are formed at points of entry of the larvae on slender trunks and branches, and in the vicinity of the larval galleries, the wood appears reddish-brown. The larval entrance holes also offer suitable sites for the entry and establishment of fungi and bacteria. The insect was first recorded in North America at St. John's, Newfoundland, Canada, in 1954.

Hosts: Recorded on poplar, alder, willow, birch and hawthorn.

Distribution: Occurs throughout central and southern Europe and extends to China. Also recorded in Newfoundland, Canada.

Life History and Habits: The life history as recorded in Spain is as follows: Adults appear in June, with mating occurring almost immediately after emergence. Oviposition occurs soon afterward. Eggs are laid separately, being fastened by one surface to the bark. Most of the eggs are laid on the trunks of trees; others on the branches. They are usually laid in bark wounds, in scar tissues and cracks and rugose places. Each female will lay from 50 to 100 eggs. Eggs hatch in 10-12 days. A young larva feeds first on the cortical tissues after penetrating the bark. It remains there for some time, making an irregular chamber above the cambium, then penetrates the wood, first toward the center of the trunk and then ascending. A conspicuous plug of debris, projecting somewhat to the outside, is always left in the entrance hole. Sap with a reddish tint percolates through the plug, the appearance being characteristic of damage caused by this species. Larvae become about half-grown towards the end of October. At this time, activity ceases for the winter and does not resume until the spring. By May, larval development is completed and galleries are 10-14 cm. long. Pupation takes place in a chamber under the bark, either at the site of the original point of entry, or just above it. Adults emerge in about 20 days, normally in early June, but sometimes as early as late May or as late as late June.

Description: ADULT - Male wingspan 2-3 cm; female wingspan 2.5-3.5 cm. Thorax bluish-black, with fine yellowish pubescence and 4 dorsal yellow spots; dorsal spots of thorax farthest apart on posterior part of mesothorax and closest together on anterior part of metathorax; two lateral tufts of black and white hairs present on metathorax. Forewings narrow and elongated; opaque, reddish-brown. Hind wings transparent, wider than forewings, with apex rounded and indentation on margin at termination of next-to-last visible vein. Forelegs with coxae bluish-black; femorae black with yellow apex; tibiae yellow, black on base. Middle and hind legs with yellow coxae; femorae bluish-black, spotted with yellow toward apex; tibiae yellow, black on base, with yellow spur. Tarsi of all legs yellow; beardless, with spinules below. Abdomen bluish-black, with all segments bordered posteriorly by yellow fringe; first abdominal segment interrupted, dorsally forming 2 spots analogous to those of metathorax and ventrally forming a single central yellow spot; last abdominal segment yellow, with a narrow median black line. Anal tuft yellow; mixed with black hairs in male and with a black median

line in female. Antennae of male bipectinate 5/6 of its length; upper part with smooth yellow scales terminated by an imperceptible brush of hairs. Antennae of female simple and smooth, dilated near apex. LARVA - Young larvae hyaline-white, about 3 mm. in length and bear inconspicuous hairs as long as diameter of body. Mature larvae 24 mm. long, 4-5 mm. wide; head ocherous, front in form of a narrow wedge; antennae 3-segmented; body ivory colored; prothorax somewhat wider than remaining segments, with dorsum yellowish marked by 2 brown furrows, which converge caudad; last abdominal segment pale yellow above, with 2 characteristic hooks; thoracic legs yellowish-brown; parapodia with fine row of chestnut hooks in form of a convergent double arc on each parapodium, except last one, which has a single arc. PUPA - Light yellowish-brown; head and thorax darker. Two rows of stiff spines on abdominal segments; single row on dorsum, except for segments 8 and 9, and segment 7 in female, which have 2 each. Terminal end of last abdominal segment bears 2 sclerotized arcs with 5 teeth each. EGG - Ellipsoidal, flattened, somewhat depressed on 2 surfaces; 0.9 mm. long, and 0.4 mm. thick. Color dull black. Polygonal reticulation present on surface. (Prepared in Survey and Detection Operations in cooperation with other ARS Agencies, U. S. Forest Service and the U. S. National Museum). CEIR 11(6):2-10-61.

Male of Paranthrene tabaniformis Rott.

Major reference: Ministerio de Agricultura, Servicio de Plagas Forestales. 1960. Principales Insectos que Atackan a las Frondosas en Espana. 143 pp., Madrid. (Includes illustration of adult).

INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

WATTLE BAGWORM (Kotochalia junodi (Heylaerts))

Economic Importance: This bagworm is the most serious pest of wattle (Acacia spp.) in South Africa. Extracts from the bark of Acacia decurrens and A. d. mollis are used in tanning. Whole wattle plantations may be completely defoliated. The true economic loss resulting from damage caused by the bagworm is not known with certainty, but there is a serious check to growth which, if repeated, will permanently damage the tree. There is also a substantial loss of both bark and wood increment. A secondary effect is that the increased penetration of light into the plantation, consequent upon the loss of foliage, allows strong growth of weeds. Where a mature plantation is heavily attacked, stripping may become difficult or impossible as the season progresses. The wattle industry contributes considerable income annually to South Africa; the annual value of wattle exports reached nearly 21.5 million dollars by 1953. The annual loss has been estimated to be approximately 3 percent, which would mean that if the export trade was taken as a basis the loss to the wattle-growing community of South Africa would have been about $645,000 in 1953. Losses to individual plantation owners may sometimes be quite severe during outbreak years; a bark loss of 30 percent has been recorded.

Peak infestations seem to occur every 5-7 years. The endemic stage is followed by 2 years of a preparatory stage when the bagworms become more numerous, and then by a prodromal or premonitory stage of about 2 years when bagworm populations increase rapidly and damage becomes evident. The eruptive stage, which follows, may last 1-3 years. Trees become completely defoliated, and bagworms may die from lack of food and are also prone to disease. An abatement of the infestation follows and populations return to normal.

Assessing the degrees of infestation is best done during February, when the bagworms are full grown and can be easily seen and when damage to foliage has reached its height. The standard system of classification of the degrees of infestation follows: (LIGHT) 1. Very few bagworms on occasional trees throughout plantations. 2. Few bagworms on most trees; no observable damage. 3. Bagworms on nearly all trees; slight damage to crowns of some trees. (MODERATE) 4. Bagworms on all trees; crowns of all trees damaged, but none completely defoliated. 5. Bagworms on all trees; some trees completely defoliated. (HEAVY) 6. Almost complete defoliation throughout plantation; occasional trees showing green foliage. 7. Virtually complete defoliation. The number of empty male bags in one particular season gives some indication of the severity of the infestation which may be expected that season. The proportion of females to males which reach maturity and are able to reproduce is approximately one to two. Therefore, by making an estimate of the number of male bags and dividing by two, a rough estimate of the number of females, expected number of larvae and degree of infestation can be made.

Distribution: South Africa.

Hosts: Several species of Acacia of which Acacia decurrens mollis is the most important.

Life History and Habits: The species takes 12 months to complete its development. Males emerge and copulation begins at the end of July and continues through August. Adult females, which never leave their bags, reach sexual maturity around the end of July and during August, and after mating lay up to 2,000 eggs or more each. The exact number of eggs depends on the vigor of the particular female. Females lay a greater number of eggs when food is abundant during their larval development.

(Psychidae, Lepidoptera)

Hatching begins 8-10 weeks later and young larvae leave the maternal bag and start spreading in search of food. The main brood of larvae emerges during September and the adults begin dying off. Larvae encase themselves soon after hatching and feed for the better part of 6 months. At first they congregate mainly on the tops of trees and at the ends of branches with young foliage. Larval feeding damage begins to appear in October and reaches a peak in January when the larvae near maturity. Feeding generally ceases in March, at which time larvae tend to congregate. It is not unusual to find several bags attached to the same twig or grouped in bunches. Pupation begins for the males in April and in May for the females.

Description: Superficially, Kotochalia junodi more closely resembles the North American bagworm (Thyridopteryx ephemeraeformis) than does any other foreign species. (See photograph below). The males of the two species may be separated in a number of ways, the most obvious being the difference in color. K. junodi is dark brown, while T. ephemeraeformis is black. Briefly, K. junodi, is described as follows: ADULT MALE - Wing expanse about 3 mm. and length of body 1.2 mm. or less. Body clothed with dense, velvet-like, brown pile. Wings practically without scales; few present along basal margin. BAGS - Male bag is smaller and more slender than that of female, and after the emergence of the adult male it can be clearly distinguished by the empty pupal case protruding from the end. LARVAE - Bodies black, or almost so, and soft and fleshy except for thoracic segments which, like the head, are sclerotized and have tortoise-shell markings. PUPAE - Males and females strikingly different. Male pupa rather typical, while female shows little resemblance to a lepidopterous pupa. (Prepared in Survey and Detection Operations in cooperation with other ARS agencies and the U. S. National Museum). CEIR 11(45):11-10-61.

USDA Photograph

Male Adults - Left, Kotochalia junodi (Heylaerts). Right, Thyridopteryx ephemeraeformis (Haworth). Female bag of K. junodi (Heylaerts)(center).

Major references: 1. Fuller, C. 1913. The Wattle Bagworm. South Africa Agr. J. 5(6):838-855; 6(1):19-33; 6(2):198-215. 2. Ossowski, L. L. J., 1956. A Guide to the Assessment of Wattle Bagworm Infestations. 20 pp. (unnumbered) (Pub. by South Afr. Wattle Growers' Union). 3. Shaw, H. 1957. The Wattle Industry. Natal Reg. Surv. 13:62-93.

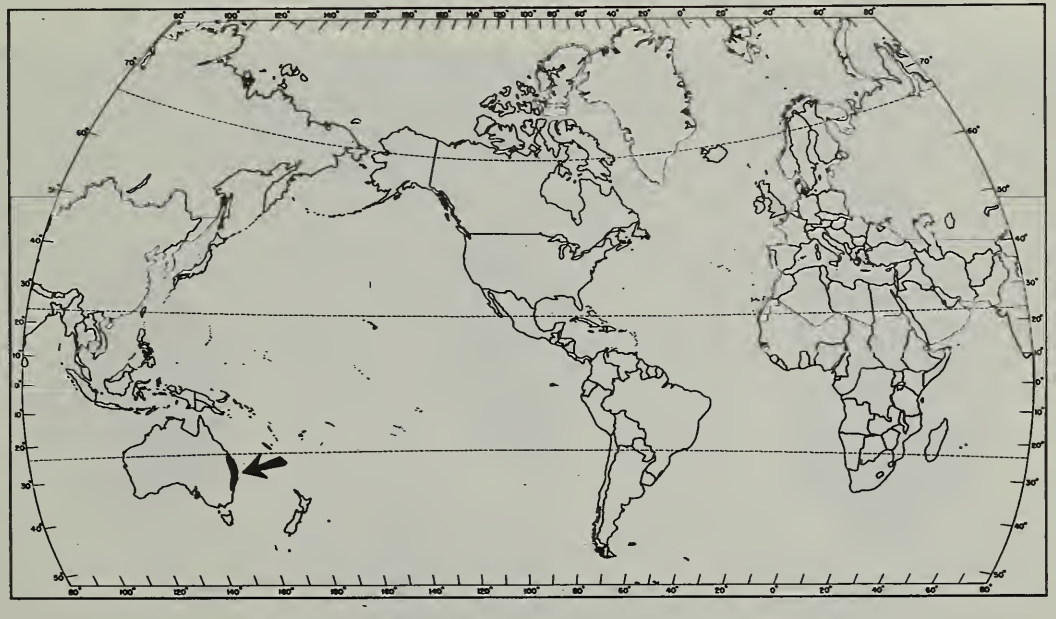
INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

BRONZE ORANGE BUG (Rhoecocoris sulciventris Stal)

Economic Importance: This pentatomid is a major pest of citrus in areas of southeastern Queensland and the north coast of New South Wales, Australia. It is essentially a pest of vigorous citrus trees, feeding by sucking sap from young and tender shoots and from the leaf, fruit and flower stalks. Fruit and leaf spotting is a secondary form of injury caused by the caustic excretions emitted by the bugs when disturbed. Excretions of the insect can also be a nuisance to man, causing inflammation of the skin and severe irritation of the eyes. Repeated attacks on citrus trees cause cumulative losses. After a period of a few years following heavy infestations, trees show little growth and become incapable of carrying a crop. Losses of 20 percent are about average for heavily infested trees, with losses of 30 percent not uncommon.

Distribution: New South Wales and Queensland, Australia (Coastal areas; S. E. Queensland and N. New South Wales).

Hosts: Attacks all commercial varieties of citrus in Australia, but orange appears to be the preferred host. The bug also feeds and breeds on Citrus australis, a wild, noncultivated, native orange.



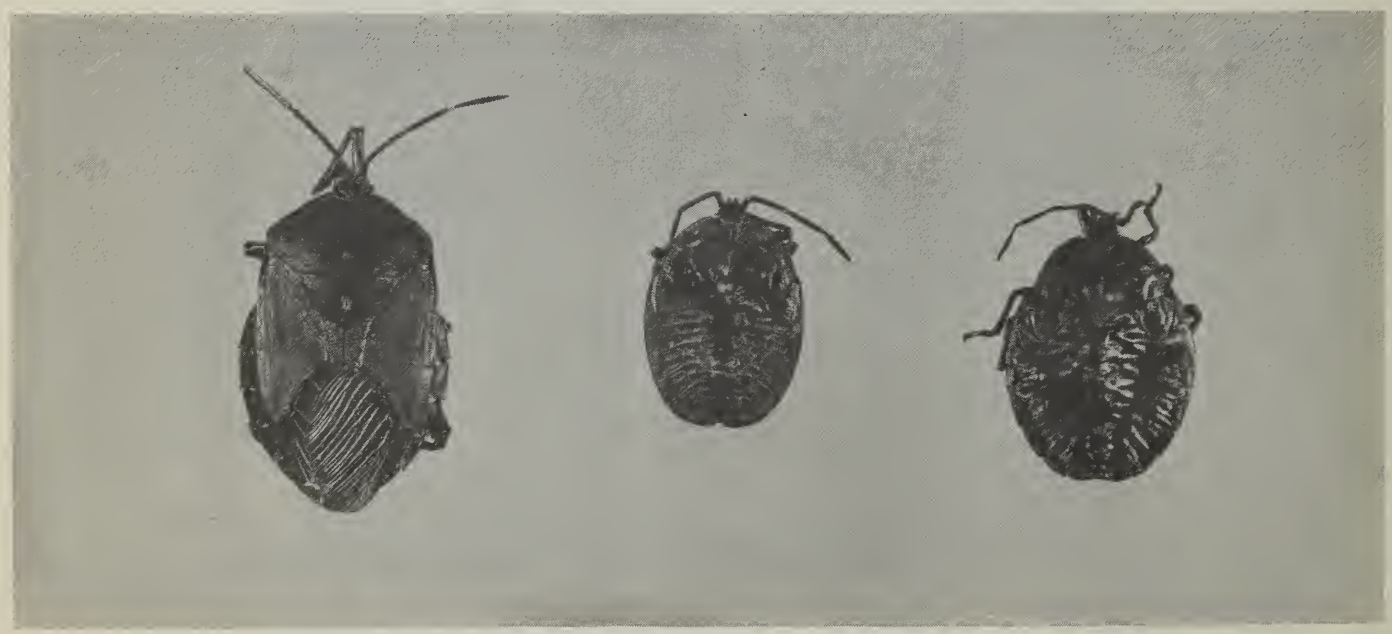
General Distribution of Rhoecocoris sulciventris Stal

Life History and Habits: Eggs are laid in February and March and hatch in just over 8 days. First-instar nymphs congregate for 5-6 days before molting, then second-instar nymphs scatter to protected places underneath the leaves on the tree and remain dormant, without feeding, throughout the winter, which is approximately 7 months. During this latter stage, the insects cling very tightly

(Pentatomidae, Hemiptera)

to the leaves and cannot be dislodged by even very strong jarring of the limbs. Feeding commences with the advent of warm weather and third-instar nymphs begin to appear in numbers in early September. A foul aroma is associated with the pest from this stage onward. The last 3 instars occupy about 3 weeks or slightly longer and adults appear in November, but are not numerous until December. Feeding and mating take place in December and January and oviposition occurs in February. Eggs are laid in batches of 14 in a characteristic formation, each batch being in 4 lines, with the 2 outside rows having 3 eggs each and the 2 inside rows with 4 each. Occasionally incomplete batches are found. Eggs are laid on leaves as a rule, but occasionally batches may be found on fruits or nearby plants. Both surfaces of the leaves are used as oviposition sites. Only one complete generation a year has been recorded. In summary, the life cycle consists of 7 stages; the egg, 5 nymphal instars and the adult.

Description: EGG - Spherical, shiny and light green to yellow in color; slightly less than one-eighth of an inch in diameter. NYMPHS - Size and shape varies with each instar. Color varies from glossy green in first instar; light green, yellow or grayish in second instar; to a shining green, changing to lighter green, orange and brilliant pink, in the third instar. The size varies from three-sixteenths of an inch long in first instar to seven-eighths of an inch in fifth instar. ADULT - Young adults light bronze above and reddish-brown beneath; older forms black above and dark brown beneath. Legs reddish-brown, becoming lighter and almost red at extremities. Head small and eyes lighter brown than surrounding parts and rather conspicuous. Antennae reddish-brown at base; first and second segments orange. Upper surface of abdomen orange or reddish towards center and dark brown to black at margins. Length, one inch; width, five-eighths of an inch at greatest width of abdomen. (Prepared in Survey and Detection Operations in cooperation with other ARS Agencies). CEIR 11(5):2-3-61.



USDA Photograph

Adult and Nymphs of Rhoecocoris sulciventris Stal

Major references: 1. Hely, P. C., 1938. Agr. Gaz. N. S. Wales 49(7):378-380.
2. Summerville, W. A. T., 1935. Queensland Agr. Jour. 43(3):245-253.

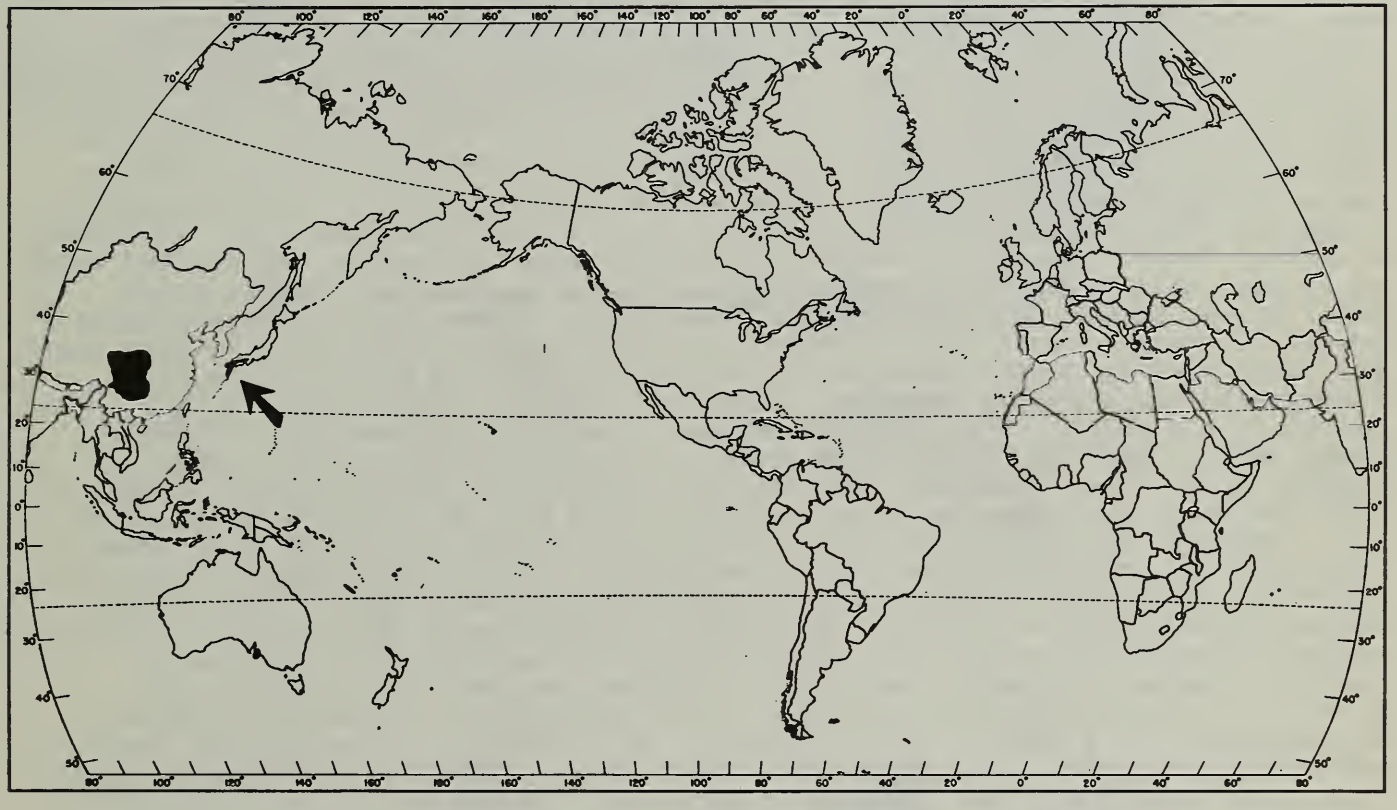
INSECTS NOT KNOWN TO OCCUR IN THE UNITED STATES

JAPANESE ORANGE FLY (Dacus tsuneonis Miyake)

Economic Importance: This tephritid, described by Tsunekata Miyake in 1919, is one of the most important pests of citrus in Japan. In that country, it is found only in Kyushu and on Amami-O-shima Island. Extensive outbreaks have occurred in some commercial citrus areas since 1947 when up to 60 percent or more of the fruits were infested. In Szechwan Province of southwestern China, the fruit fly has also been reported to have infested 50 percent of the oranges at Kiangtsin during 1940.

Distribution: Japan (Kyushu and Amami-O-shima Island) and southwestern China (Szechwan and Kweichow Provinces).

Hosts: Citrus, including orange, grapefruit and mandarin orange.



General Distribution of Dacus tsuneonis Miyake

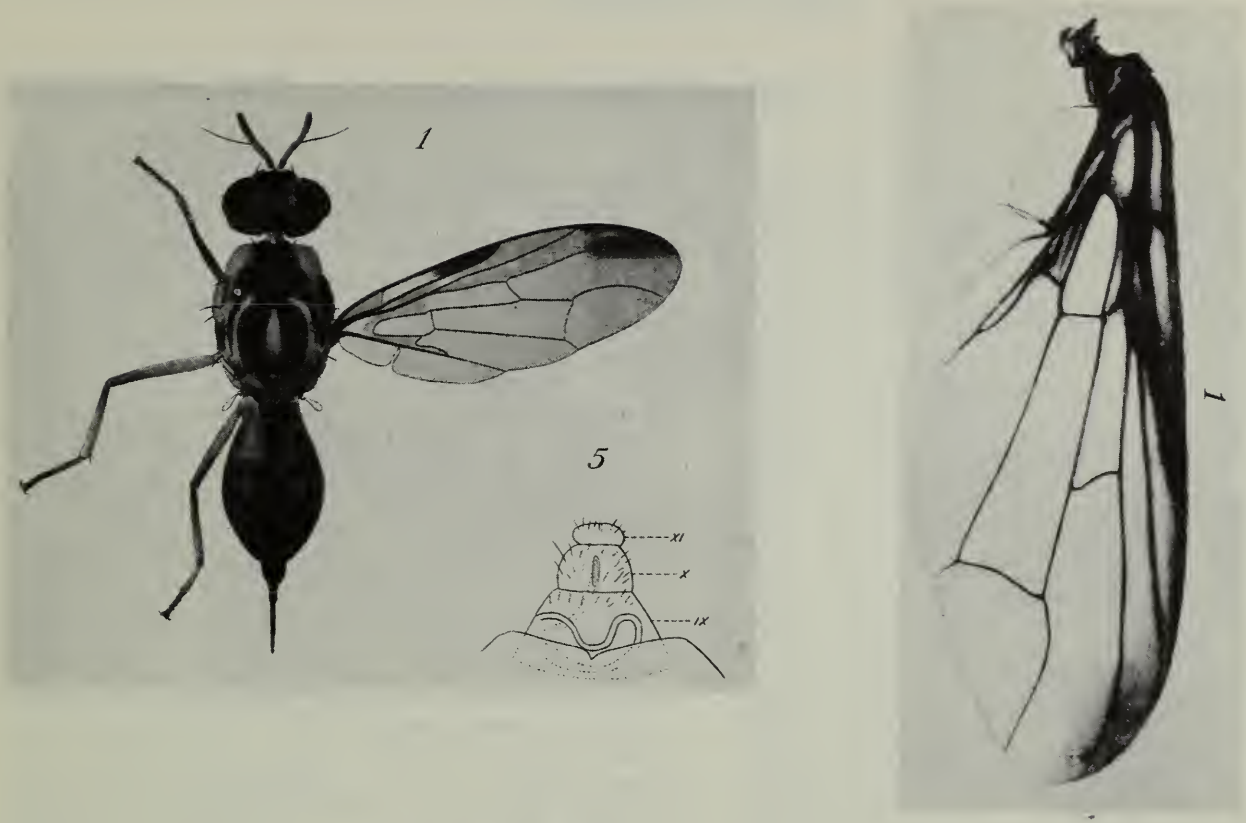
Life History and Habits: The biology as studied in Japan is as follows: Adult emergence dates vary from place to place, but detailed studies show that the emergence period covers about 50 days from the beginning of June to the middle of July. They are occasionally found as late as October, however. The length of the preoviposition period of the adults reared under field laboratory conditions was between 17 and 25 days. The ratio of males to females was one to one. It appears that copulation is of frequent necessity with the females that are freely ovipositing, and copulation probably takes place after depositing each batch of eggs. The adults feed on honeydew excreted by various species of aphids, coccids and psyllids, which appears necessary for health, longevity and

egg production, during the preoviposition period. Flies are usually found in shady, thickly wooded places. Eggs are laid under the rind, with thick-skinned fruit being seldom attacked. A single puncture is usually made in each infested fruit. Although frequently 2-6 eggs may be found in each puncture, only one larva emerges from the puncture. Larvae appear about the first of October and devour the contents of one carpel after another, from 2-10 carpels being infested by a single maggot. The larva is mature by the beginning of November and usually the infested fruit falls to the ground. The larva leaves the fruit and enters the ground for pupation within a few hours after the fruit drops. Occasionally the larva leaves the fruit on the tree. Pupation occurs 1-2 inches in the soil.

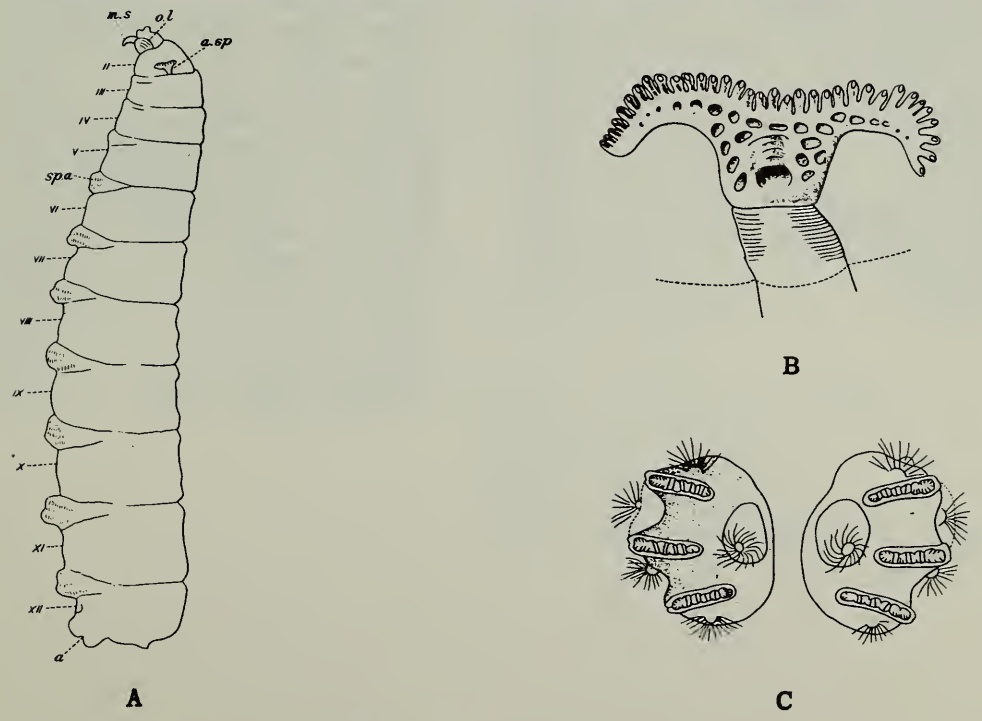
Description: ADULTS - Conspicuously large; female 11 mm. long (excluding ovipositor) and wing expanse 10 mm.; male slightly smaller. Head yellow or ochraceous; ocellar triangle black. Two shiny black, claviform spots on clypeus; a small subtriangular piceous spot in middle of each gena, just below lower margin of eye. Antennae ochraceous, arista piceous, with yellow base. Proboscis with a piceous ridge at base mottled with brown; palpi yellow. Thorax densely punctate, with short, yellowish pubescence, ferrugino-ochraceous; a medium longitudinal, ⅄-shaped purplish testaceous streak on dorsum, terminating posteriorly in center of the scutum; a pair of rather faint submedian, more or less wavy, purplish testaceous lines, interrupted at transverse suture and united posteriorly with posterior branches of ⅄-shaped streak; a yellowish patch on each humeral callus; scutellum yellowish, with 2 bristles; median plate of scutellum ochraceous; most of lateral sides of thorax ochraceous. Halteres ochraceous. Legs ochraceous, with yellow pubescence. Wings hyaline, with more or less grayish tinge; veins fusco-ochraceous; area between veins R_1 and R_{4+5} tinged with honey-yellow; radial cell at region above the medial and cubital cells also honey-yellow; a fuscous suffusion at apex of wing; second auxillary lobe wanting in male. Abdomen oval, as broad as thorax, densely punctate, bright ochraceous above, yellowish beneath and brownish at end, with a short, yellowish pubescence; a longitudinal median black, rather broad, streak extends length of abdomen, or almost so; transverse bands present on third, fourth and sometimes the fifth segment, band on the third segment cross-marking longitudinal streak. EGG - Length 1.4 mm.; width 0.3 mm. Creamy white and fusiform in shape, obtusely rounded at one end and rather pointed at the other. Two small elevations on shell at obtuse end. LARVA - Creamy white, with slight yellowish tinge. Length 12-13 mm.; width 3 mm. at broadest part. Body elongated, cylindrical, pointed at anterior apex. Anterior spiracles each with numerous lobes, each provided with an elliptic aperture at tip. Posterior spiracles located dorsally on posterior surface of 12th segment; they appear as paired elliptic chitinous plates, each of which has 3 transverse apertures, the middle one of which is placed slightly external to the others. Each aperture elongate-elliptic, guarded by a chitinous border which bears many inwardly directed fine hairs and shows internally many partitions, owing to presence of some chitinous rods that lie across the aperture. Around each spiracle lie five groups of radiating flat hairs, some of which are branched, each arising from a small, round tubercle. In internally placed groups, hairs appear whirled around their respective tubercles. PUPARIUM - Elliptical, about 10 mm. long and 4 mm. wide, ochraceous in color. (Prepared in Survey and Detec- Operations, in cooperation with other ARS agencies). CEIR 11 (51):12-22-61.

(See illustrations on page 31)

Major references: 1. Chen, S. H. 1940. Sinensia (Nanking) 11 (1/2):131-135. 2. Miyake, T. 1919. Imperial Cent. Agr. Expt. Sta. Bul. (Tokyo) 2(2):85-165, illus. in Engl. 3. Sun, C-y., Du, I-l., and Liao, Y-m. 1958. Acta Oecon. Ent. Sinica (Peking) 1(2): 175-187. In Chin., Engl. Sum. 4. Yasumatsu, K. and Nagatomi, A. 1959. Kyushu Univ. Faculty of Agr. Sci. Bul. 17(2):129-146. In Jap., Engl. Sum.



Adult Female and Wing of Dacus tsuneonis Miyake



Larva of D. tsuneonis Miyake (A). Anterior Spiracle (B) and Posterior Spiracles (C)

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Scientific Names

Common Names